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ABSTRACT

One way to meet the problems of space needs of new programs and a wider constituency without resorting to new buildings is to modernize available campus space. With costs of new construction steadily rising, with space on which to build dwindling and with the growing affection for old, familiar buildings on campus, modernization often serves as the ideal answer. The range of choices is a wide one, beginning with limited clearning up, painting, recarpeting and exchange of furniture, all the way to the kind of remodeling that leaves nothing standing but the old outside walls. In between there are solutions like the one at the University of Tennessee, where some walls were taken out, big new flexible spaces created, and almost immediate moving in is possible. Despite drawbacks, modernization in its various forms is able to help hard-pressed managers of campus space to come to grips with these problems. (Author/PG)

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EFL

Build if you must, but consider...

3 MODERNIZATION

3

1 Redeploying Campus Space and Time
2 Non-Campus Facilities
4 Found Space
5 Cooperation
6 Interim Facilities
7 Restructuring College Housing

This is the third of seven articles to address the problem of what higher education can do to meet the space needs of new programs and a wider constituency without resorting to new building. One way to meet space needs is to modernize available campus space. With costs of new construction steadily rising, with space on which to build dwindling and with the growing affection for old, familiar buildings on campus, modernization often serves as the ideal answer. Typical approaches are reviewed in this article and a larger selection of case studies is on hand at Educational Facilities Laboratories. They may be obtained on request from EFL, 477 Madison Avenue, New York, N.Y. 10022. The information for these articles and the complementary case studies comes from a project jointly funded by the Office of Experimental Schools of the National Institute of Education (U.S. Department of Health, Education and Welfare) and by Educational Facilities Laboratories.

The Issues

As recently as ten years ago, during the great building boom of the 1960's, college administrators were likely to demolish the obsolete or merely old building on campus and put a new one in its place.

These older structures, often built of sturdy masonry, with high ceilings and generous blocks of space, have now been rediscovered as great treasures. At the same time, with the cost of new construction for even uncomplicated buildings running to $45 per sq. ft. (and more in the big cities), the cost per square foot of modernization can be cut to half that or even less. Not only is the cost of razing saved, but so is the possible cost of acquiring new land. Nor are inroads made into valuable adjacent campus land, frequently being used for recreation, athletics or parking.

Indeed, campus interest in modernization is part of a national trend. In the area of office buildings alone, for example, as of the beginning of 1974, nearly 15,000 office buildings are being modernized at a cost of some $2 billion, a rise of 38 percent over a 1971 study, according to the magazine *Buildings*. While no comprehensive statistics have been compiled for higher education facilities, *Buildings* magazine reports that limited returns from a survey of physical plant directors put their 1974 modernization projections at $567 million for a total of 1993 buildings; this compares with $554 million for 1973 and $425 million for 1972.

One interesting sidelight is the effect modernization is having on the attitude of college administrators towards long term planning involving the physical plant. Until recently modernization meant simply physical solutions

to specific problems of function, structural stability, efficiency of heating, ventilating, lighting and the like.

Today, however, administrators are starting to think of modernization as part of an overall inventory of space needs and projections—a process applied across the board to all of a university's facilities. The point is to subject all campus facilities to a periodic evaluation (say every 5 or 10 years) according to carefully drawn up criteria. This provides a continuing and accurate profile of condition of an institution's physical plant. Massachussetts Institute of Technology, for example, keeps a centralized computer-aided space inventory to make sure that existing facilities are used to the utmost.

Wisconsin's Bureau of Facilities Management (responsible for public buildings in the state, including the state universities) also has devised a method for evaluating its inventory of buildings. Educators, legislators, architects and engineers are involved in a process under which a checklist of factors on each building is reviewed and the results evaluated. A final point rating is used to help administrators decide whether modernization or demolition is called for. Structural evaluation goes hand in hand with an evaluation of educational performance.

A further sidelight on modernization is the decision of some institutions (such as MIT) to amortize buildings over their expected lifespan. This is common practice for commercial building owners, but as an accounting process it is a new trend in collegiate finances. By building up a fund to cover depreciation, colleges can assemble capital to be used for major modernization (or even new construction) at the appropriate time.

Advantages of Modernization

Aside from satisfying the needs of cost control, land use and nostalgia, modernization also offers an increased flexibility of financing in a day when many institutions are short of cash. New construction requires rather large amounts of cash as soon as a loan is negotiated. When modernizing, the work can be phased, the amounts are smaller and the facility can bring in income while work is under way. (Not that modernization *always* costs less; in some cases, where a building is very run down, where utilities are difficult to reach or where a building has a lot of architectural ornament to preserve, costs can sometimes exceed those of new construction).

Another advantage of modernization is that it is possible to do it at several levels of detail depending on the condition of the building, available funds and so forth. For example, at one end of the scale is the clean up and paint approach, which can be visually and psychologically very effective at no great cost. At the other end is a major gutting of an existing building and virtual insertion of a new core, as was done in two cases at Princeton University and the University of Akron. Minor, but valid advantages, for example, are the ability to open windows on pleasant days and save valuable fuel by avoiding year-round mechanical ventilation of a sealed building; and the fact that older buildings usually occupy highly accessible campus sites. Modernization takes less time than new construction and often buildings can be used while modernization is under way.

The "grand empties" such as reading rooms, lounges, chapels, storage space and old gyms can be converted to most contemporary needs. As for alumni support, several administrators have discovered, to their surprise, that a decision to modernize a building, far from drying up sources of alumni funds, on the contrary inspires alumni to give for a building that often holds nostalgic memories for them.

Drawbacks of the Method

Modernization can bring about serious problems of scheduling, especially if no alternate or interim facility exists and learning must go on while reconstruction is under way. Moreover, the process is messy as a rule, and the essential preliminary analysis required to uncover the real conditions of the building are often complex, costly, and maybe dangerous. Many prominent architectural firms steer away from this kind of work, which therefore does not always get the benefit of the best available design talent. Furthermore, what might be expected to reduce costs can sometimes inflate them instead, by having to bring the structure up to building code levels; this can mean erecting additional exit stairs, installing sprinklers or other fire fighting systems, adding ventilation and upgrading electrical wiring.

Criteria for Decision-making

The options available to college administrators as a rule come to four:

- continue to use a facility in its present form and condition;
- renovate it for virtually the same use;
- renovate for a new use;
- tear the building down.

Before they can make this decision, administrators need to have certain facts at hand. In its simplest form, a list is drawn up of the basic physical elements of the structure and their percent contribution to the cost of construction. The list should include:

Exterior walls	Wall finishes
Roofing	Other finishes
Flooring	Fixed equipment
Partitions	Excavation
Ceilings	Foundations
Heating	The vertical structure
Ventilation	The horizontal structure
Air conditioning	Wiring
Plumbing	Lighting

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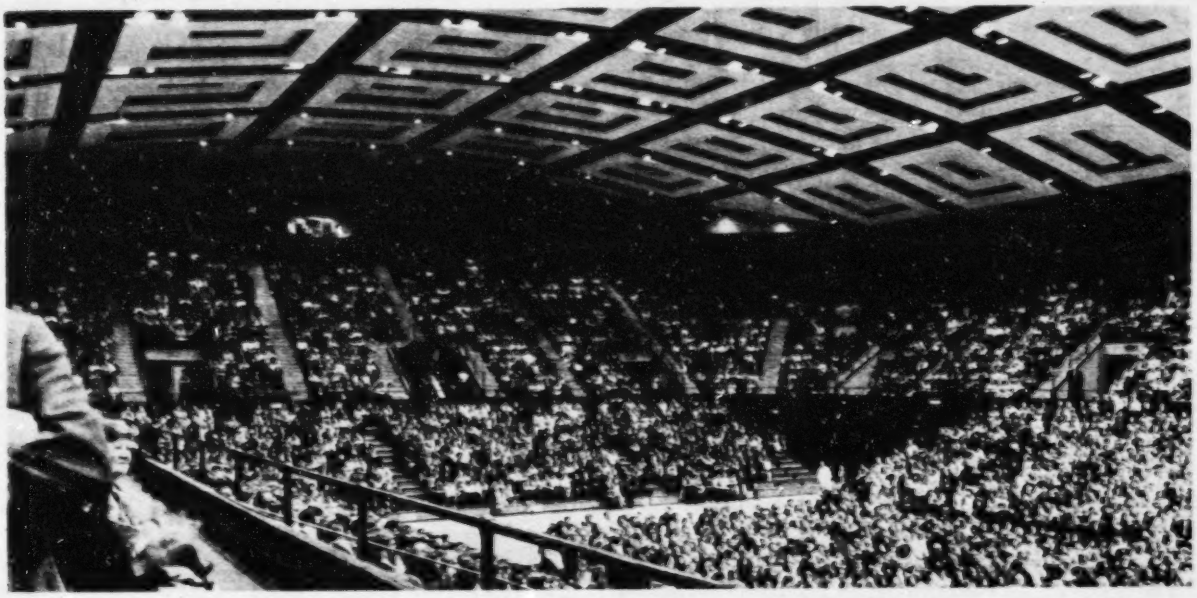
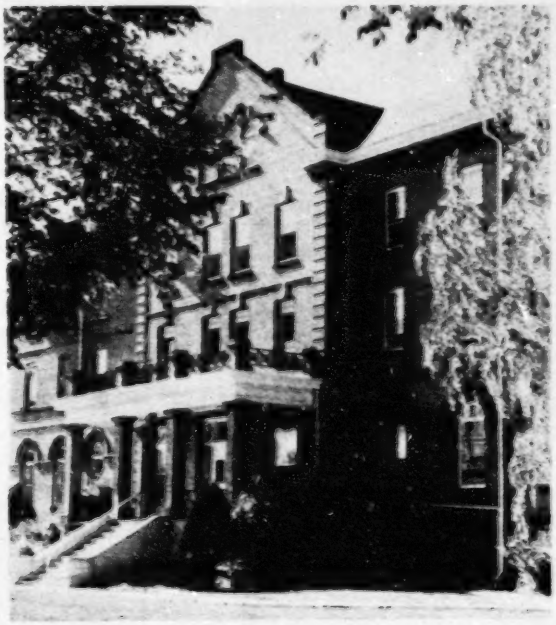


Lectures, graduation, as well as basketball, tennis and track events now take place in a 47-year old fieldhouse after the University of Washington in Seattle modernized the formerly dirt-floored, under-mechanized structure. (Hugh N. Stratford photo).

Former "Old Main" (with the "S"), gymnasium and residence hall are three of seven buildings modernized by North Dakota State School of Science to provide specialized technical facilities for its rising enrollment. (NDSSS Special Services Office photos).



A point system should then be worked up, with certain items receiving a greater weighting than others (for example, structure should receive more points than wall finish). The point system is then related to the actual proportion or cost that each of the above elements have to the total cost of the building. For example, 50% of the roof may require replacement; if the roof is 5% of the cost of the building, then the roof contributes 2½% to the modernization index.

A common rule of thumb is that if the index, made up of items that require replacement or renovation, comes to more than half of an equivalent new building, then modernization is not justified. Yet, there are those who take issue with such a break-even index; they point out that certain intangibles, like image, aesthetics, alumni memories evoked by a building, are hard to give numbers to, and they may override other considerations. In any case, the point scoring is a basis for judgment, not the final judgment itself.

In addition to physical criteria, educational performance also is incorporated into the measurement equation. In the end will emerge a composite feasibility index that combines educational function, construction costs, operating and maintenance costs, and some kind of "intangibility" factor that covers image, aesthetics and memory.

Case Studies in Modernization

EFL has checked with institutions large and small, public and private, and heard from some 40 that reported efforts on their campuses. These examples fell into four categories of case studies.

1. Renovation of academic buildings

"Same use" renovation of academic buildings is among the more common solutions. **The University of Chicago**, for example, took advantage of the completion of a new graduate library to take the popular old Rebolt Library and convert it into a modernized undergraduate library, adding classrooms, offices and a canteen. The three-story, neo-Gothic structure, which dates to 1911, had been popular among students, faculty and alumni.

The renovation, which took 15 months for the 110,000 sq. ft. at a cost of about $2 million, has now given the building a new long lease on life. The existing building was reviewed by the Renovation Department of the university architect's office, plus help from outside consultants. The money came from private donations. Most estimates put the cost of replacing the building at more than twice what was spent.

Largely forced into renovation by its tight urban location, the University of Chicago has also carried out other modernization examples. These have included converting animal quarters in an old science building to faculty offices and laboratories, and renovating the university press building to provide space for the university's book store.

A far more drastic process took place at **Washington University** in St. Louis. In 1968, the school of dentistry was using a building dating back to 1927, saddled with outdated heating and electrical systems which regular custodial procedures were no longer able to maintain at any degree of efficiency. The school, short on funds and on space in the area of the hospital, was faced with closing altogether, but decided instead to completely modernize its building. By a miracle of patience and ingenuity, the school carried out its functions during construction. The task took four years and moved from one part of the building to the other by a subtle game of musical chairs. Cost came to some $3 million but a study showed that a new school would have cost about five times as much. By remaining in the city, the school was able to expand its community health and preventive dentistry care programs.

In Seattle, the **University of Washington** recently carried out an ambitious major modernization of its field house and basketball pavilion which also dated back to 1927. What started out as a space for 13,000 became a highly flexible facility which, at the slight price of reduced seating (to 11,500), became a multi-purpose auditorium and recreation facility. This provides not only for basketball but also for tennis, track events, lectures, concerts and graduation.

The work, which was done in four phases, handled some 181,000 sq. ft. of space for a total cost of $3½ million (or just under $20 a sq. ft.), a good price in an urban labor market. The university claimed it saved the cost of several new buildings through this process. In addition, it has generated additional revenue from events such as rock concerts and lectures.

When Whig Hall, one of an identical pair of buildings that flank **Princeton University's** Nassau Hall axis, burnt in 1969 with only its outside walls left standing, many students and alumni were shocked. The nature of the solution left many of them still in a state of shock, but no one can deny the scope and originality of the design. A wholly contemporary building was inserted inside the classical marble shell, with parts of the modern style even peeping through on the east side. An independent structural system was placed in the building and bright primary colors painted on the inside walls. Space was increased from just under 12,000 to over 15,000 sq. ft. in the process. The cost of construction and furnishings was very high, but this is a classical example of intangibles deciding on a solution which on purely economic grounds would have been discarded.

New York City's **Cooper Union**, which has occupied its Foundation Building since 1859 (the date on which Abraham Lincoln addressed its students and faculty), is being renovated at a cost of $11.5 million to bring this landmark building up to modern requirements. These consist of housing the entire school of art and architecture, library, the division of humanities and social sciences and of adult education, and offices for the administration. In keeping with modern need for flexibility, interior walls are being removed at great cost to

create open-space work areas; fireproofing is being added and air conditioning is being installed. The project is due for completion in 1974. It is another example of the structural and mechanical drawbacks of an old landmark being overridden by assets of location and architectural character.

2. Paint-up, fix-up

A carefully planned method of cleaning, fixing, painting and otherwise treating the visible portions of a campus building (or, in fact, of all buildings on a campus), is an important method of updating the character and even the functioning of older buildings.

Massachusetts Institute of Technology, for example, which has at its core the great classical complex designed by Welles Bosworth in 1916, found that the wide stark corridors and great entrance lobbies (expecially the one under the main entrance dome), were sore visual features and a wasteful use of space.

In the late 1960's planners at MIT found that these stark interiors were not responding to "the changing nature of learning." Accordingly, these planners set up a continual process of "paint-up, fix-up" modernization on campus, especially in public areas. Lobbies and corridors were enlivened with paint, murals, public information centers and exhibitions, many of them designed by students. New signage was put in. The four story lobby under the big entrance dome is used by the department of architecture for course projects on uses of the public environment. Students have designed a two-story platform structure where people may sit, place posters, play music or dance. Student labor keeps costs down. Out of pocket expenses are paid by the MIT planning office or by an academic department.

As for classrooms, these have been made both warmer and more flexible by means of new lighting, carpeting, paint and furnishings. All classrooms have been put on a phased modernization cycle—as of 1974, about 25 percent have been so adapted.

Another college which has followed this route is **Colorado College** in Colorado Springs. This institution has done selective modernization of its traditional classrooms, many of which date to the beginning of this century. Classrooms, seminar rooms, even storage spaces have been cleaned out, painted, carpeted, provided with lounge furniture, murals and living room lamps to provide a more informal atmosphere. The move has been a hit among students and faculty, and renovation is to cover all classrooms as funds permit.

3. Conversion to alternate use

More, perhaps, than in some of the preceding categories, taking an existing, probably obsolescent college structure and building a new use for it, taxes the ingenuity and imagination of both administrators and architects. Yet often this solution is a very practical one, especially where a building, whose fabric and structure are still sound but whose function has disappeared, can be used to fit a new academic program that lacks a home.

Estabrook Hall now houses the school of architecture at the **University of Tennessee** in Knoxville. It was once a storage building, filled largely with junk machinery left over from the Civil War. It was built in the 1890's and was about to be demolished. The first dean of the new architectural school discovered it in his search for a home for the school. He quickly found that the building, with its arches, solid construction, high ceilings and a magnificant lightwell met both the requirements of space and the requirements of character he wanted in his new school.

Six months later, the converted building was ready for full time use. Partitions had been ripped out to form large open interior spaces which could be shaped to fit changing needs. Important parts of the old building, such as the maple floors and the exterior, were saved. Large spaces were filled with movable partitions and modular funiture of great flexibility. Costs were kept down as design was done by an architect faculty member and construction by students and the university's maintenance crews; and the work was funded out of the university's maintenance and operating budget. Use far into the night, seven days a week, is witness to the soundness of that decision.

In a similar vein, **Indiana University** converted a turn-of-the-century graduate library into a single facility for student services and for the production and storage of audio-visual presentations. It is one of the oldest buildings on campus; it is centrally located and served as an excellent site on which to consolidate services hitherto spread about over the campus. The 100,000 sq. ft. remodeling took about three years to plan and carry out, and cost $3 million. It was paid for out of state funds except for a $500,000 insurance settlement from two fires. Indiana officials say that a new central facility of similar size would have cost about $5.6 million.

A classic, often cited example is **Harvard University's** Boylston Hall. Since its completion as a chemistry laboratory in 1858, it has gone through five incarnations, the latest, in 1965, to a language study center.

Dr. Norman Auburn has said that, like old soldiers, old libraries and old gyms never die; they just become student centers, computer centers, classroom and administration buildings. A fresh example of this is **Oxford College** of Emory University in Georgia. Oxford converted its turn-of-the-century library into a student center. Some of the more imaginative new uses for the grand old spaces include turning a reference room into a game room, the librarian's office into a snack bar and the periodical room into a television lounge.

Brown University, with its great old Victorian, 1891-built Lyman Gym and Colgate Hoyt Pool, decided to convert these into an experimental theater and dance studio to absorb the needs of a growing department. The central gym area is to become a 150-seat theater adaptable to different stage and seating arrangements, with the running track used as a balcony. A cafe theater,

library, dressing rooms and miscellaneous film creation and dance studio spaces will be included by building a floor over the pool. The estimated $1 million cost compares with the $6 million or so which a similar performing arts center would cost new. Other examples of imagination and enterprise are on file at EFL.

4. Conversion of campus housing to alternative use

Ever since colleges began to relinquish their role as "in loco parentis," they have had to face the dilemma of what to do with a surfeit of dormitories built on campus in the 1950's and early 1960's. As student life-styles veered towards greater independence and as college administrations matched this with greater permissiveness, dormitory rooms and, in some cases, whole residential halls stood empty, costing money but producing no income.

What do you do with an empty dormitory? (An in-depth study of this problem will appear as the seventh in this series of articles). Modernization or conversion to other uses is one common solution, as in many cases colleges have given up the idea of trying to bring students back from off-campus and into the dorms. In some cases modernization is minor, such as a new use as married student housing, housing for the elderly or retarded; other uses, however, require a sizable investment.

One example of the latter is the installation of a newly authorized college of human medicine and osteopathic medicine in one wing of a 1200-man dormitory complex at **Michigan State University** in East Lansing. The State legislature had agreed to support operation of the new college but provided no funds for any major capital expenditure; yet for $2.4 million in renovation costs, the new school obtained offices, land, storage and central air-conditioning.

Mankato State College in Minnesota found new uses for empty dorm space by converting it into a college health center, a day care center and a center for the mentally retarded.

A prime example of changing use on a brand new campus is conversion of one recently completed dorm at the **Amherst** campus of the **State University of New York at Buffalo** into a health sciences library; the first three floors of this 12-story building will be converted in this fashion; the other nine stories will be remodeled for academic use.

The University of Alabama, saddled with 1,000 new dorm spaces at a time of levelling enrollment, managed to lease one entire dorm to the State's Mental Health Board, and adapted space in three other dorms for a day care center and offices.

Other examples are on hand in EFL's files.

Summary and conclusions

Modernization is clearly being forced on university administrations by circumstances: high costs of new construction, widespread nostalgia for historic architecture, dwindling campus space on which to place new buildings, the often immediate need for new facilities which can best be accommodated by an existing building—these factors add up to make modernization one of the most attractive solutions available to administrators today.

The range of choices is a wide one, beginning with limited cleaning up, painting, recarpeting and exchange of furniture, all the way to the kind of remodeling that leaves nothing standing but the old outside walls. In between there are solutions like the one at the University of Tennessee, where some walls are taken out, big new flexible spaces created and almost immediate moving in is possible.

Despite drawbacks (such as the meticulous attention required in planning modernization and carrying it through), modernization in its various forms is able to help hard-pressed managers of campus space come to grips with these problems. Also, as the companion fourth article of this series shows, they may apply this method in many cases to space found outside the campus walls.

Readers who would like to have additional case studies on modernization should write to EFL.

—Stephen A. Kliment
Jane Lord

A day care center that serves 100 children daily occupies the garden and first floor of a converted dormitory at Mankato State College, Mankato, Minn. A center for the mentally retarded and the college health center also were carved out of former underused dorms. (Mankato State College photo).